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GENERAL OFFICES | ENGINEERING HEADQUARTERS  
GILLINGHAM & WORTH STREETS, PHILADELPHIA 24, PA.

CONSULTANTS ON INDUSTRIAL WATER PROBLEMS

February 21, 1961

Marlin Rockwell Corporation  
Plainville, Connecticut

Attention: Mr. Peter Fischer

Gentlemen:

It is the intent of this letter to summarize briefly our recent visit at your plant in regards to initial operations and tests of your industrial waste treating facilities.

The plant was generally installed as designed and had been receiving raw wastes for several days prior to the writer's visit. Wastes were entering the primary basin were settling and oil separation was accomplished. However, it was obvious that no skimming had been done and closer examination showed oil collections greater than one foot in depth. As a result of the non-skimming, oil in relatively large quantities was being transferred to the batch tanks. Since this condition could not be readily overcome, the receiving basin was emptied entirely of its contents with oil and solids being pumped directly to the existing lagoon. While the basin was down modifications were made in order that skimming could be accomplished.

Also, the flights were not as efficient as they should be due first to breakage and secondly to the fineness of the solids. The flights were to be replaced and, in addition, it was recommended that a rubber type wiper be attached to each flight as well as end angles. The purpose of these additions of a flexible material was to obtain more effective dragging and cleaning of the fine solids. These improvements had not been made when the writer left your plant.

Inspections of other areas of the plant including the batch treatment tanks and accessories, chemical mixing and feeding apparatus and allied accessories all appeared to be satisfactory. The pumping facilities installed also appeared adequate for the intended service.

With the required modifications and the relatively low rate of raw waste production, it was impossible to accumulate a full tank for treatment during the writers stay. However, samples were obtained and a great number of jar tests were made to determine the treatability and the chemicals required to effect clarification.

Reference was made to treatments carried on during the study. These treatments were on the accumulated wastes in the lagoon. 3 of h

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were highly dilute as compared to the present waste. With the elimination of condensate, surface water, and other miscellaneous clean wastes discharged to the lagoons, the raw wastes are presently quite concentrated. By observation, the wastes contain high amounts of free oil, heavy concentrations of water soluble oil, soaps and other cleaning compounds. Therefore, the actual treatment was considerably different than that required for the lagoon water. It was noted rather early in the test that very high dosages of the coagulant were required to break the emulsion formed by the water soluble oils. Various combinations of chemicals were used to obtain treatment. For coagulation the two base or primary coagulants tried were alum and ferri-floc. As an aid to the clarification process bentonite clay and calcium chloride were employed. Other tests included the use of sulfuric acid and several polyelectrolytes.

Since each batch of waste was different and will continue to vary, the use of several chemicals may be necessary. One of these successful combinations found during the jar testing was approximately 1500 ppm alum, 600 ppm calcium chloride and 300 ppm clay. Another combination included 1200 ppm ferri-floc and 500 ppm calcium chloride.

Equally effective was the depression of the pH of the waste by sulfuric acid then the addition of alum at a dosage of 1200 ppm and calcium chloride at 300 ppm. Effective also was the use of one of the cationic polyelectrolytes when used with acid and alum.

It was apparent from the tests that it would be necessary to actually make jar test trials on each batch prior to treatment in order to determine the most effective chemicals and the quantities of each. Subsequent to our visit you had reported two successfully treated tanks using the combinations alum, calcium chloride and clay. Your description of the success obtained despite the high dosage of alum, is indicative of the waste concentration. Further, you reported that the primary sedimentation and skimming tank was performing its function with high amounts of oil and solids removed at this stage. You also advised that flows from the plant had substantially increased and that it may be necessary to treat as high as one tank daily.

A rather radical difference in results on the concentrated wastes as compared with the more dilute wastes from the lagoon was the fact that the sludge floated in place of settled. This, no doubt is due to the higher oil concentration contained in the waste and it being thrown out of solution or emulsion and carrying the floc to the top. This has not presented a treatment difficulty. The batch tanks having been designed with multiple side outlets may be satisfactorily operated on either settling or floating sludge.

It is desirable from the equipment standpoint as well as the regulations by the Connecticut Stream Pollution Control Commission to maintain pH of the treated wastes in the range of 5.5 to not over 8.5. We do not believe you will experience any difficulty in staying within these rather wide limits.

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It is necessary that the chemicals to be added be made into slurry or solution form prior to the addition. As recommended, the agitator in the batch tank should be at high speed for at least 15 minutes and reduced to a gentle mix for approximately one hour following the addition of chemicals. The settling period should be as long as possible to obtain maximum clarification.

We believe you will find results obtained by jar testing suitable for direct transfer to plant scale treatment. If you find variations in this then appropriate adjustments must be made.

Sludge volumes resulting from chemical treatment will probably vary considerably based on each individual tank. Further, the longer the settling period the more compacting of the sludge will result. It is entirely possible that sludge volumes may range from one or two percent to as high as 20 percent of the total volume of waste treated.

It was the intent to dispose of this settled sludge in sludge lagoons adjacent to the treatment plant. We still believe this is the most practical method of disposal although if you deem it economically feasible to transport these settled wastes for disposal elsewhere, we are confident there will be no objections from the State.

The plans approved by the State include a sludge lagoon in the general area of the plant and it was believed such a lagoon would be so tightly sealed from the deposited sludge that nothing of any significance would seep into the ground and provide a continued potential for ground water contamination. We have no reason to change our belief and continue to suggest consideration for one or two lagoons for handling the sludge resulting from treatment. It is highly desirable to have two lagoons so that one may be used while the other is draining and drying. It is conceivable that it may be necessary to actually decant from these lagoons periodically, particularly in times of low evaporation rates.

The writer again emphasizes the need for exercising control of discharges from the actual process or use in the plant. The less concentrated materials reaching the waste sewers means less chemicals required for treatment and consequently less sludge produced. Also, it is extremely important that the settling and skimming tank be operated at utmost efficiency with removal of oil and solids at a maximum to avoid their being transferred to the batch treatment tanks.

Similarly, care must be exercised in the treatment as well as the draw-off following treatment to assure that the clarified liquid only is discharged to the storm sewer and accumulated solids directed to the lagoon.

Following a few months of successful operation it is suggested that you contact the Stream Pollution Authorities for an inspection of the facilities. Samples may be submitted to our laboratory for analysis if you so desire.

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We are enclosing a brochure from the Tennessee Corporation on Ferri-Floc as promised.

As was suggested to you during our recent visit, we again emphasize the need for keeping a daily log on the treatment and operation of your waste plant. This will be particularly helpful for your operators and will also be a continuing record in case further litigation develops from the Water Company. Please feel free to contact the writer for discussions regarding handling and treatment of your waste. We will also be available for further services as required either on industrial waste or water treatment. The writer expresses appreciation for the courtesies and cooperation extended during the recent plant tests.

Very truly yours,

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Enc.

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